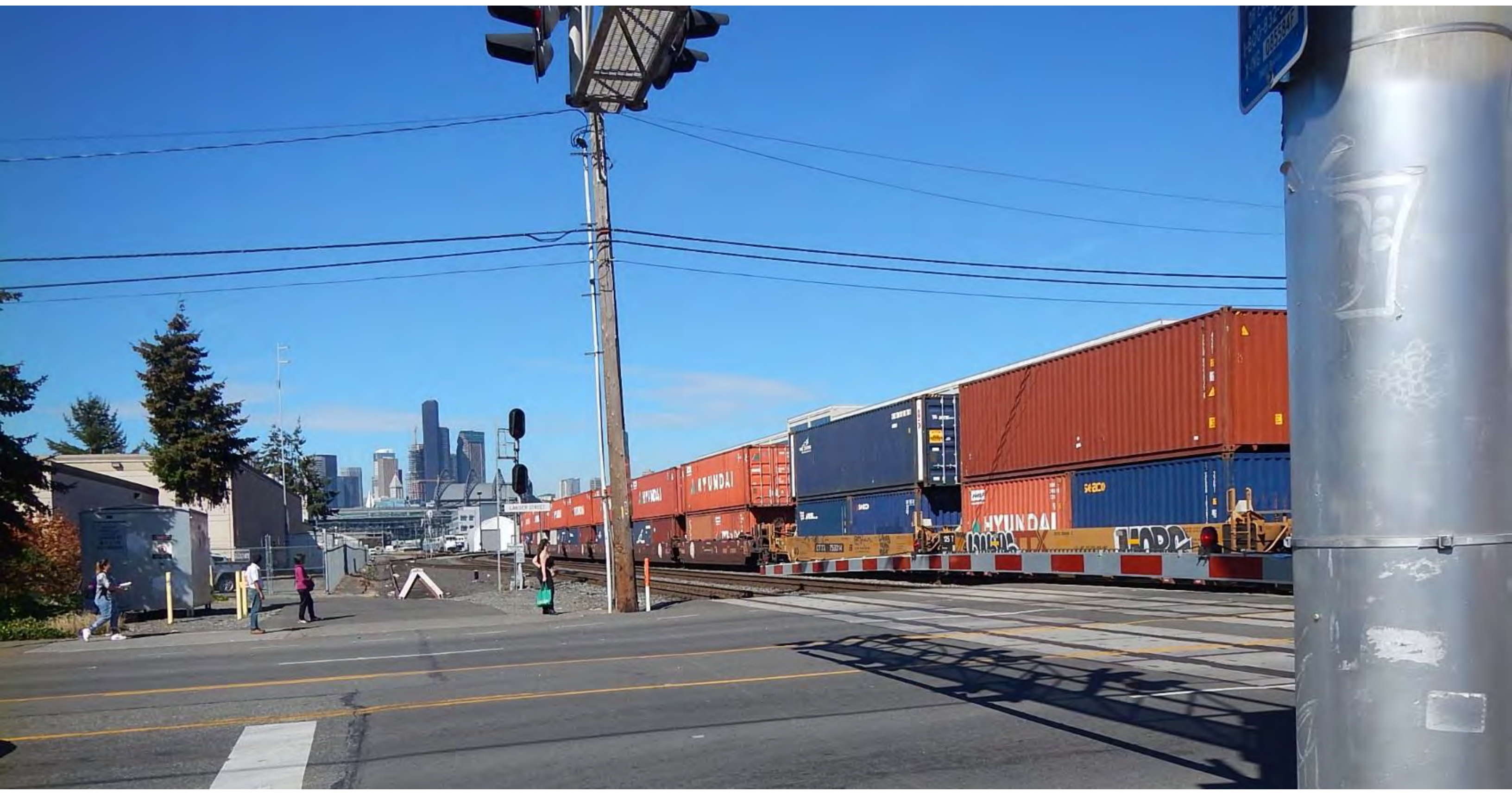
Seattle Department of Transportation

SOUTH LANDER STREET GRADE SEPARATION PROJECT

HAZARDOUS MATERIALS DISCIPLINE REPORT



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ACRONYMS AND ABBREVIATIONS

AAI	All Appropriate Inquiries
ASTs	aboveground storage tanks
bgs	below ground surface
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
City	City of Seattle
CMMP	contaminated media management plan
CORRACTS	Corrective Action Sites
cPAHs	carcinogenic polycyclic aromatic hydrocarbons
CSCSL	Confirmed and Suspected Contaminated Sites List
CWA	Clean Water Act
Ecology	Washington State Department of Ecology
EDR	Environmental Data Resources, Inc.
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	environmental site assessment
FAST	Freight Action Strategy
HASP	health and safety plan
LQG	large quantity generator
LUST	leaking underground storage tank
MACT	Maximum Achievable Control Technology
msl	mean sea level
MTCA	Model Toxics Control Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFRAP	No Further Remedial Action Planned
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OSHA	Occupational Safety and Health Administration
PAHs	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PSCAA	Puget Sound Clean Air Agency

ACRONYMS AND ABBREVIATIONS (CONTINUED)

PSE	Puget Sound Energy
RAATS	RCRA Administrative Action Tracking System
NFA	No Further Action
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
SCL	Seattle City Light
SEPA	State Environmental Policy Act
SHWS	State Hazardous Waste Site
SMC	Seattle Municipal Code
Sound Transit	Central Puget Sound Regional Transit Authority
SPU	Seattle Public Utilities
SQG	small quantity generator
SR	State Route
TSD	treatment, storage, and disposal
TS&L	type, size, and location
USC	United States Code
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
USTs	underground storage tanks
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code
WA ICR	Washington Independent Cleanup Report
WISHA	Washington Industrial Safety and Health Act
WSDOT	Washington State Department of Transportation

EXECUTIVE SUMMARY

The hazardous materials study was conducted for the City of Seattle's proposed S Lander St Grade Separation Project to document the existing conditions, the potential hazardous materials impacts of the project, and potential mitigation measures in accordance with the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA). The term "hazardous materials" used in this report is separate and distinct from the language used in the City's safety procedures for construction work.

The project site is located in an area that has been developed with industrial land uses for many decades. Database searches indicate that 120 sites within 1/4 mile of the project footprint have a history of, or potential for, hazardous materials to be present in soil and/or groundwater. Project analysts evaluated these sites and ranked them based on their potential to result in impacts during construction or operation of the project. This ranking effort identified 21 sites with the greatest potential to impact the project; a further screening identified three sites with the highest level of concern, based on known history of contamination and proximity to the project footprint. The three sites of highest concern, all adjacent to the project footprint, are:

- **Pyramid Tires (currently Pep Boys), also known as Bill Bailey for Times of Seattle/Big O Tires, 2701 4th Ave S.** This site is documented to have been contaminated with petroleum products in soil and/or groundwater from its historical use as a gas station. There are records of leaking underground storage tanks on the site; some cleanup has occurred, but contamination may remain.
- **Texaco #0043, 2461 4th Ave S.** This property, currently a Shell gas station, has been documented to contain gasoline-range hydrocarbons and benzene in groundwater. Recent sampling in 2015 has indicated the presence of gasoline and benzene exceeding state Model Toxics Control Act (MTCA) cleanup levels, including in monitoring wells on the southern portion of the property near the existing S Lander St right-of-way.
- **Former U.S. Post Office site (currently Seattle Public Schools John Stanford Center for Educational Excellence), 2445 3rd Ave S.** This site was formerly a U.S. Post Office distribution facility; maintenance and servicing of U.S. Postal Service vehicles occurred at this site from the mid-1950s until approximately 2000. Groundwater beneath the site has been found to be contaminated with benzene, toluene, ethylbenzene, and xylenes (BTEX); gasoline-range hydrocarbons; diesel-range hydrocarbons; and polynuclear aromatic hydrocarbons (PAHs). Some cleanup has occurred and a restrictive covenant has been placed on the site to mitigate any potential on-site risk. Based on the groundwater flow to the west, distance of the known sources from the right-of-way (north of right-of-way approximately 250 to 500 feet), the potential for these sources to have impacted the right-of-way at significant concentrations is low.

As a result of former land uses in the area, the project has the potential to encounter hazardous materials during construction. Potential construction impacts could include the exposure of workers or the public to:

- Hazardous materials contained in soil or groundwater within the right-of-way
- Hazardous materials contained in unknown underground storage tanks within the right-of-way
- Construction-related spills or releases

While low levels of contaminants could be present throughout the project footprint, the likelihood of encountering contamination is greatest in the vicinity of the three sites of highest concern. Because some cleanup activities have occurred on two of these sites (Seattle Public Schools and Pep Boys) and contaminant levels have been documented as declining in the third (Texaco), the degree of contamination is not expected to be severe in the areas that project construction would excavate. The potential also exists for hazardous materials to be released into the environment by construction equipment and materials.

To mitigate potential construction impacts, the City would:

- Prepare and implement plans, programs, and procedures required by local, state, and federal regulations to identify potential hazards
- Designate personnel responsible for hazardous materials management, and
- Establish uniform procedures for managing contamination when it is encountered, including protocols for sampling, handling, and disposal.

The City of Seattle would prepare and implement plans pursuant to the Seattle Stormwater Code, the Seattle Stormwater Manual, the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit, and the Seattle Standard Plans and Standard Specifications for Road, Bridge, and Municipal Construction (2014) that describe best management practices (BMPs) to prevent pollution, control stormwater flows, and protect resources during construction.

Operation of the project is generally not expected to affect potential hazardous materials in soil or groundwater within the right-of-way. However, new bridge foundations, support elements, and utilities could physically impede cleanup of soil or groundwater, if required, or act as conduits for the movement of contamination. Potential contaminated soils and groundwater could also affect maintenance activities for the completed project. Operation on the S Lander St Grade Separation Project may also result in the release of hazardous materials into the environment from accidental spills. However, because construction of the project would improve traffic operations, reduce congestion, and separate roadway traffic from trains, fewer accidents are expected, and therefore less risk of spills. The City of Seattle has a Spill Reponses Program in place as part of their overall Stormwater Management Plan. No long-term adverse effects are anticipated.

1. INTRODUCTION AND PROJECT DESCRIPTION

This report documents the study of hazardous materials that was conducted for the City of Seattle's proposed S Lander St Grade Separation Project. The study was conducted to satisfy the National Environmental Policy Act (NEPA) and will address requirements for the Washington State Environmental Policy Act (SEPA). This report describes the existing conditions, the potential hazardous materials impacts of the project, and potential mitigation measures.

1.1 Project Background

The City of Seattle (City) proposes to build a bridge on S Lander St between 1st Ave S and 4th Ave S to provide a grade-separated crossing over the BNSF Railway's railroad tracks that will improve local traffic circulation and safety in the City's SODO neighborhood. S Lander St is an essential east-west corridor that is heavily used by freight and commuter traffic as well as pedestrians, bicycles, and transit. It serves one of the largest manufacturing and industrial centers in the state, including the Port of Seattle's seaport terminals. The street currently intersects with four BNSF tracks at an at-grade crossing located between Occidental Ave and 3rd Ave S. Available data indicate that more than half of the BNSF rail cars that move through Washington go through the S Lander St crossing, contributing to vehicular delays averaging over 4½ hours each day. These delays affect freight, commuters, local businesses, and the public. An overcrossing at this location would eliminate delays caused by train crossings, benefiting mobility and safety in the area.

The City envisioned the S Lander St Grade Separation Project nearly 20 years ago. It was one of the original Freight Action Strategy (FAST) Corridor projects (Texas Transportation Institute 1997), intended to improve railroad crossings along the BNSF Everett-Seattle-Tacoma rail corridor. There are currently two existing grade-separated crossings in the north end of SODO at S Royal Brougham Way and Edgar Martinez Dr (SR 519); to the south, the Spokane St Viaduct provides a route that passes above this set of railroad tracks. Between those two locations, S Lander St is the most viable of the remaining grade separation options because of its wide right-of-way, the distance between railroad tracks and adjacent streets, and the relatively small railroad crossing width. These factors allow for a shorter crossing that has sufficient space to reach the necessary clearance requirements over the tracks. The grade separation would be designed to provide the necessary vertical clearance over the railroad tracks while maintaining access to local businesses.

The S Lander St Grade Separation Project is a high-priority project in the Seattle Freight Master Plan and in the 2015 Plan to Move Seattle, the 10-year City strategic plan for increasing safety, reducing congestion, and balancing modal needs. It also supports the Industrial Areas component of the Seattle Comprehensive Plan and was identified as a Tier 1 project by the Seattle Industrial Areas Freight Access Project. These plans have elevated the project as a City priority not only because of its safety, congestion, and multimodal access benefits, but also because of its important role in the regional freight network.

1.2 Project Location

The project area is shown in Figure 1-1. The project area extends along S Lander St from 1st Ave S on the west to 4th Ave S on the east. Improvements would generally be made within the existing 100-foot-wide City right-of-way.

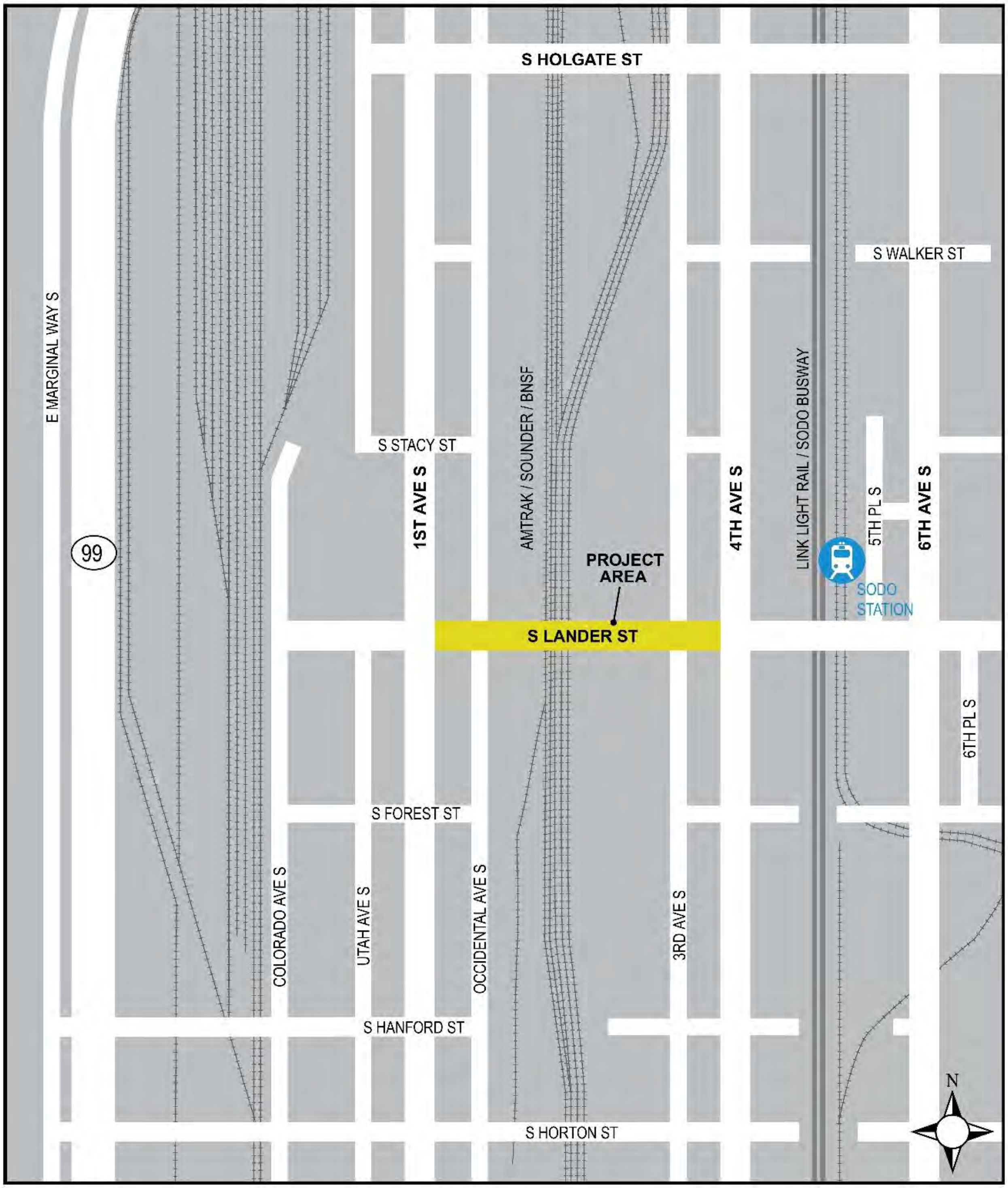


Figure 1-1. Project Area

1.3 Purpose and Need for the Project

The primary purpose of the project is to provide a grade separation between the roadway and the BNSF tracks to reduce delays and improve safety for all users. The City's goals and objectives for the S Lander St corridor have been documented in the Access Duwamish Report in 2000 (City of Seattle and Port of Seattle 2000) as well as the bridge type, size, and location (TS&L) study in 2016 (COWI 2016).

1.4 Project Description

The project would extend from 1st Ave S on the west to 4th Ave S on the east. Both of these roadways serve as major north-south arterials in the existing surface street network. The grade-separated structure would have a four-lane cross section, which would accommodate forecast traffic volumes through the year 2040.

Table 1-1 summarizes the main project design features related to the bridge alignment, local access, and nonmotorized facilities. Each of these elements is described in more detail in the following subsections.

Table 1-1. Summary of Project Design Features

Project Element	Description
Bridge alignment	Bridge centerline offset 6 feet north of existing S Lander St centerline.
Bridge profile	To meet the railroad track-clearance requirement of 23.5 feet and a desired maximum grade of 7%, the bridge would be 7 to 8 feet above Occidental Ave S, eliminating its existing intersection with S Lander St.
Cross section	67.5 feet in total width including exterior barriers. Includes two 12-foot lanes, two 11-foot lanes, a 14-foot-wide multi-use path, and a barrier between motorized and nonmotorized vehicles.
Nonmotorized facilities	14-foot-wide two-way shared use path on north side of the bridge.
Local access west of railroad tracks	Dead-end Occidental Ave S on each side of bridge.
Local access east of railroad tracks	Two-Way Connection—two-way surface street along south side of bridge, crossing under bridge to Seattle Public Schools John Stanford Center for Educational Excellence site.
S Lander St intersections at 1st Ave S and 4th Ave S	Westbound S Lander St approaching 1st Ave S—one left-turn lane, one through lane, and one right-turn lane. Eastbound S Lander St approaching 4th Ave S—one left-turn lane, one through lane, and one through right-turn lane.

1.4.1 Bridge Alignment and Cross Section

The proposed bridge alignment is offset 6 feet northward of the existing centerline of S Lander St as shown in Figure 1-2.

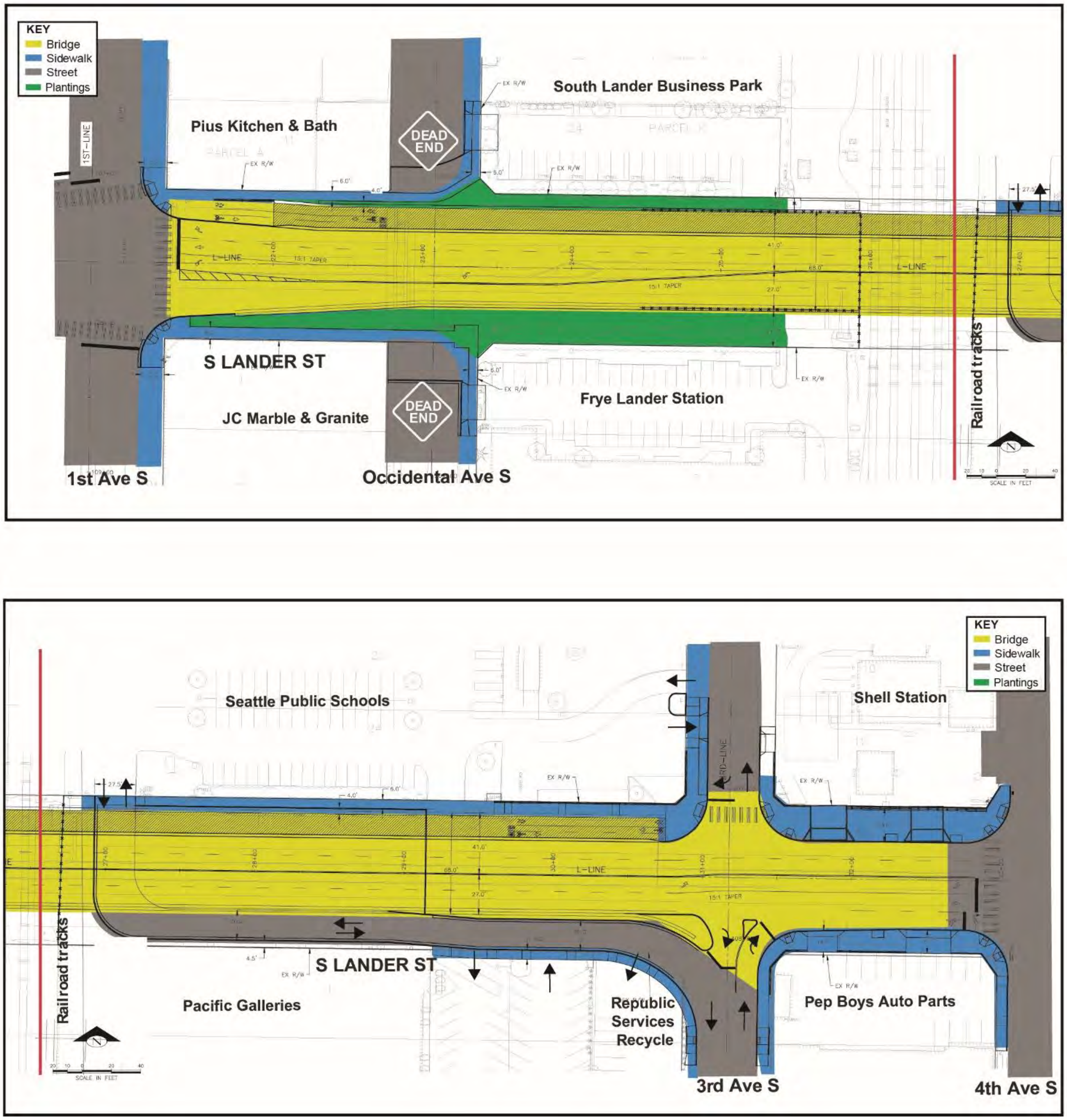


Figure 1-2. Proposed Alignment

A four-lane bridge is proposed for this project. The total width of the bridge would be 67.5 feet, with a cross section that would include a 14-foot-wide multi-use path for nonmotorized traffic (described below), one 12-foot lane (curbside) and one 11-foot lane in each direction, plus a 2-foot shoulder adjacent to the eastbound barrier and a 1.5 foot lane separator between the nonmotorized facilities and vehicle lanes. Figure 1-3 depicts the proposed bridge cross section.

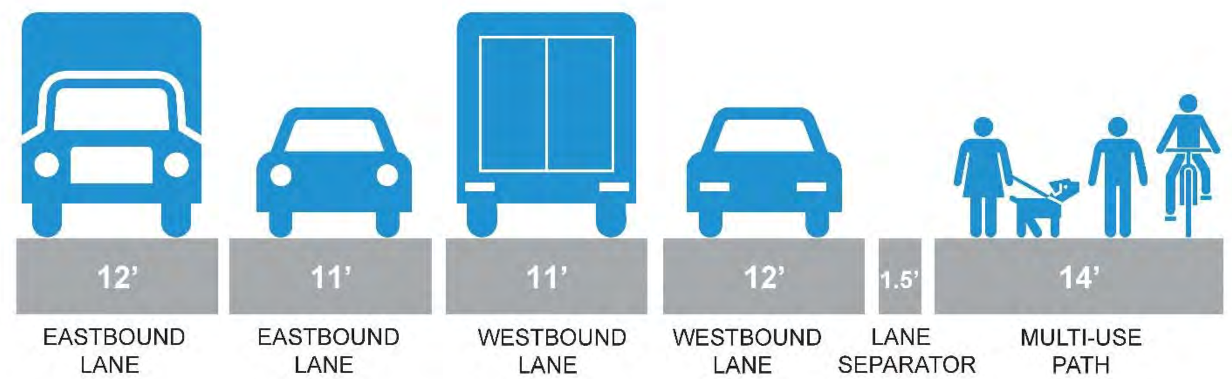


Figure 1-3. Proposed Bridge Cross Section

The bridge would be a 4-span structure, with drilled shaft foundations up to 200 feet in depth. Geofoam approaches, up to 20 feet in height, would be used to reduce the loading on the underlying utilities between exterior bridge barriers (not shown).

The proposed bridge must clear all BNSF railroad tracks by 23.5 feet and a future Amtrak rail line by 22.5 feet; the desired maximum grade for the roadway is 7 percent. Given those design parameters, the bridge approaches would meet Occidental Ave S about 7 to 8 feet above the existing street grade, which would eliminate the existing intersection. There would be more horizontal distance between the railroad tracks and 3rd Ave S to the east, and the intersection at S Lander St/3rd Ave S would be retained by raising 3rd Ave S by 2 to 3 feet.

1.4.2 Nonmotorized Facilities

The project would create a 14-foot-wide, two-way multi-use path on the north side of the bridge, separated from the vehicle lanes by a 1.5-foot lane separator (Figure 1-3). This configuration would accommodate the large majority of pedestrians in the corridor who walk along the north side, which is along the direct walking route between the Starbucks Center, the Seattle Public Schools John Stanford Center for Educational Excellence (district headquarters building), and the SODO Link light rail station. The 14-foot width is comparable to other multi-use trails such as the Elliott Bay Trail, the West Seattle Trail across the Spokane St swing bridge, and the SR 520 regional shared-use path across the new floating bridge. The multi-use path on S Lander St would provide capacity for shared use by both pedestrians and bicyclists, space for passing, and separation between vehicular and nonmotorized traffic. On the west, the path would continue to 1st Ave S. On the east, the dedicated path would end at 3rd Ave S; however, a wider sidewalk would be included between 3rd and 4th Aves S to accommodate the potential increase in bicycle activity.

In addition to the multi-use path on the bridge, sidewalks with a minimum width of 6 feet would be provided at street level adjacent to the Seattle Public School District headquarters, the access road to 3rd Ave S, and on each side of the roadway between 1st Ave S and Occidental Ave S (see Figure 1-2).

1.4.3 Local Access West of Railroad Tracks

The bridge approaches would be elevated above Occidental Ave S west of the railroad tracks, which would eliminate the ability to connect the street north and south of S Lander St. As a result, Occidental Ave S would be dead-ended north and south of the bridge. Figure 1-2 shows the proposed configuration.

Between 1st Ave S and the railroad tracks, the new structure would eliminate access to businesses from S Lander St because the roadway would be elevated above these sites. The driveways for the South Lander Business Park and Frye Lander Station would need to be moved to Occidental Ave S, with access to the arterial network provided via the S Forest St/1st Ave S intersection to the south and the S Stacy St/ 1st Ave S intersection to the north. Both of those intersections are signalized and provide access from all directions.

1.4.4 Local Access East of Railroad Tracks

Local access to the Seattle Public Schools, Pacific Galleries, and Republic Services properties located east of the railroad tracks would be provided via a two-way local roadway along the south side of S Lander St at the 3rd Ave S intersection, as shown in Figure 1-2.

1.4.5 Intersections at 1st Ave S and 4th Ave S

The intersection at S Lander St and 1st Ave S would be designed to accommodate three westbound lanes: a left-turn lane, a through lane, and a right-turn lane. The left-turn lane would allow the intersection to operate with protected or protected-permissive left-turn phasing, consistent with current operations. Only one through lane in each direction is necessary for the expected demand. A right-turn-only lane would allow the pedestrian crossing of the intersection's north leg to be separated from right-turn traffic, if necessary. One eastbound departure lane (leaving 1st Ave S) would be wide enough (or would have buffer space) to allow for large truck-turning movements.

The intersection at S Lander St and 4th Ave S would also be designed to accommodate three westbound lanes: a left-turn lane, a through lane, and a through/right-turn lane. The inside eastbound lane on the bridge would transition to the left-turn lane at this intersection, and signage would be provided to alert motorists that they are approaching a turn lane.

1.5 Regulatory Context

Numerous federal, state, and local laws and regulations govern the handling, disposal, and remediation of hazardous materials. Provided below is an overview of the most common of these laws and regulations.

1.5.1 Federal Laws and Regulations

The following federal laws and regulations could apply to hazardous materials that may be encountered during construction and operation:

- *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and All Appropriate Inquiries (AAI) (40 Code of Federal Regulations [CFR] 312).* CERCLA is a federal law designed to clean up sites contaminated with hazardous materials as well as broadly defined "pollutants or contaminants." CERCLA's broad authority to clean up releases or threatened releases of hazardous materials that may endanger public health or welfare or the natural environment was given primarily to the U.S. Environmental Protection Agency (EPA).

- *Resource Conservation and Recovery Act (RCRA), Hazardous and Solid Waste Amendments (United States Code [USC] 42 § 6901).* Regulations promulgated under RCRA set standards for the treatment, storage, and disposal of hazardous waste in the United States.
- *Occupational Safety and Health Administration (OSHA) Standards, Hazardous Materials (29 CFR 1910.120).* These standards provide regulations regarding worker safety associated with hazardous materials. This law is administered by OSHA, the federal agency responsible for enforcement of safety and health legislation. It sets provisions for worker health and safety issues, compliance, and training programs.
- *Clean Water Act (CWA) (33 United States Code [USC] § 1251-1387).* The CWA is the primary federal law governing water pollution. Its objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands.
- *National Pollutant Discharge Elimination System (NPDES).* This regulation is part of the CWA. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters.
- *National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 5, Parts 61-71).* These are emission standards set by the EPA for a particular source category that the EPA determines to be achievable, which is known as the Maximum Achievable Control Technology (MACT) standards.
- *U.S. Department of Transportation Hazardous Materials Regulations (49 CFR Parts 171-180).* These laws regulate the procedures, training, and management of hazardous materials transportation.

1.5.2 State of Washington Laws and Regulations

The following State of Washington laws and regulations could apply to hazardous materials that may be encountered during construction and operation.

- *Model Toxics Control Act (MTCA) (WAC 173-340).* Specifies the programs and procedures for investigation and cleanup of sites containing hazardous materials, including specific requirements for remedial investigations, risk assessment, beneficial use analysis, feasibility studies, and remedy selection and implementation processes. MTCA also sets the cleanup levels for contaminants in soil, groundwater, surface water, and air. MTCA Method A cleanup levels were designed for cleanups that are relatively straightforward or only involve a few hazardous materials. MTCA Method B cleanup levels utilize generic (Standard Method B) or site-specific assumptions (Modified Method B) to calculate cleanup levels. MTCA Method C cleanup levels utilize less stringent exposure assumptions and are intended to evaluate industrial sites.
- *Dangerous Waste Regulations (WAC 173-303).* Regulates the handling, management, and disposal of dangerous waste.
- *Solid (Non-dangerous) Waste Disposal (Revised Code of Washington [RCW] 70.95, WAC 173-304).* Regulates the handling, management, and disposal of non-dangerous waste.

- *Water Quality Standards for Surface Waters (WAC 173-201A).* Defines the goals for a water body by designating its uses, setting criteria to protect those uses, and establishing provisions such as anti-degradation policies to protect water bodies from pollutants.
- *Wastewater Discharges to Ground (WAC 173-216).* Relates to the federal and state NPDES programs that regulate and set policy for waste discharges to the ground under a state-granted permit process.
- *Underground Storage Tank (UST) Statute and Regulations (RCW 90-76, WAC 173-360).* Provides regulations for the operation and management of USTs, including leak protection standards, compliance, training, construction specifications, and decommissioning requirements.
- *Washington Industrial Safety and Health Act (WISHA).* Sets provisions for worker health and safety issues, compliance, and training programs. The Washington State Department of Labor and Industries is the state agency responsible for enforcement of safety and health legislation and follows the federal OSHA program.
- *Safety Standards for Construction Work: Lead (WAC 296-155).* Regulates the health and safety standards and protocols for construction workers potentially exposed to lead or work sites in which lead is used in construction.

1.5.3 Local Jurisdiction Laws and Regulations

The following local jurisdictions administer regulations that could apply to hazardous materials that may be encountered during construction and operation.

- The Puget Sound Clean Air Agency (PSCAA) sets regulations and guidance related to air pollution that may be encountered during construction.
- The City of Seattle has its own requirements and guidance for a number of discharge or spill issues that may be encountered during construction. These include NPDES permits to manage construction-related stormwater and compliance and spill response for the storage, use, and handling of petroleum projects or hazardous materials during construction.
- King County's industrial waste program regulates wastewater discharge from construction sites under appropriate permits, including discharges to publicly owned treatment works (i.e., wastewater treatment facilities).

2. METHODOLOGY

This chapter summarizes the methodology used to complete the hazardous materials study. For purposes of this discipline report, "hazardous materials" means hazardous substances, hazardous wastes, and contaminated soil and groundwater. Hazardous materials impacts are the impacts that existing hazardous materials could have on the project, as well as hazardous materials-related impacts the project could have on the natural and built environment. The term "hazardous materials" used in this report is separate and distinct from the language used in the City's safety procedures for construction work.

It should be noted that in 2008, a Draft Hazardous Materials Discipline Report (Herrera 2008) was prepared for an earlier design of the S Lander St Grade Separation Project. The methodology used in the current Hazardous Materials Discipline Report is consistent with the methodology utilized for the initial report, but has been updated as necessary to reflect changes in existing conditions and project design.

2.1 Selection of Study Area

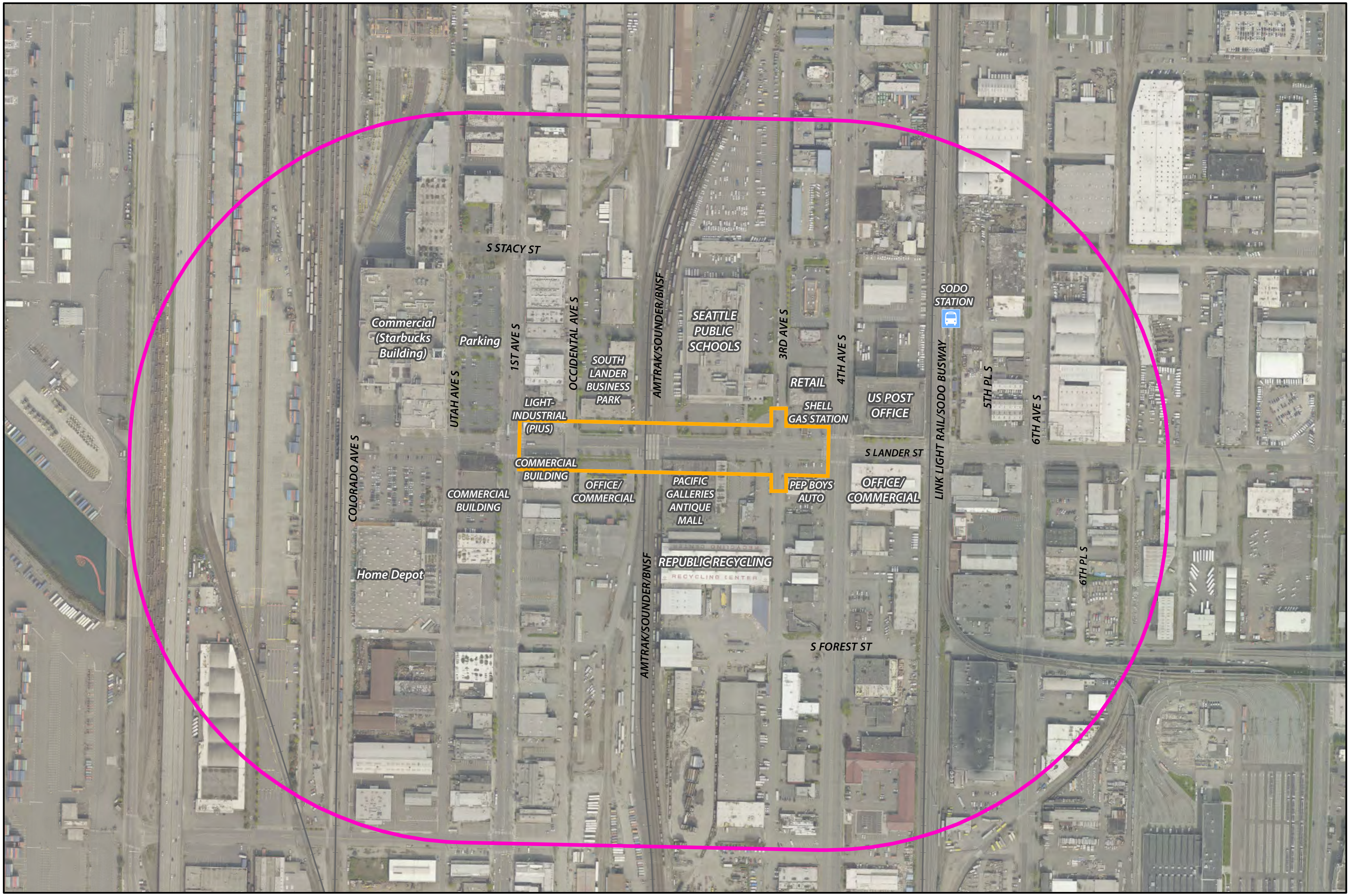
The study area was selected to encompass the project footprint and the hazardous materials sites in the vicinity in which contaminants could potentially migrate into the project footprint or be affected by project construction and operation. The physical environment was used to inform the selection of the study area boundaries by considering the topography, known soil types and strata, groundwater gradient, and groundwater flow direction. The number and location of contaminated sites in the vicinity of the project footprint and the potential for contaminants from those sites to be encountered during, or affected by, project construction and operation was also considered.

The final study area boundary selected was ¼ mile from the project footprint. This distance is sufficient to evaluate potential hazardous materials impacts to the project footprint based on the identified characteristics of the physical environment. The study area is shown in Figure 2-1 and is consistent with the study area used in the 2008 discipline report (Herrera 2008).

2.2 Data Collection and Analysis

Environmental conditions related to hazardous materials were evaluated through regulatory documentation, historical use information, on-site reconnaissance, and previous environmental documentation or available information.

The identification of potential records and analysis followed the general principles of ASTM E1527-13 (ASTM 1527), Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM 2013), with modifications to apply to the study area as a whole, rather than to a single parcel of land. ASTM 1527 also provides standards for source information, including review of state and federal databases and records that contain information on hazardous materials contamination and conditions, as well as land use data including historic and present uses, and where available, soil, groundwater, or other media sampling results. Washington State Department of Transportation (WSDOT) documents were also reviewed for guidance on the content required for discipline reports and for performing all appropriate inquiry. These documents are the Guidance and Standard Methodology for Hazardous Materials Discipline Reports (WSDOT 2009) and Environmental Manual (WSDOT 2016).



Project Footprint (Approximate)

1/4-mile Study Area

Feet

0 500 1,000

Service Layer Credits: Pictometry International Corp.

Figure 2-1
Project Footprint and Study Area

S Lander St Grade Separation

2.2.1 Physical Environment

Aspects of the physical environment that affect the hazardous materials analysis include topography, geology, and hydrogeology. A number of information sources were consulted to understand the physical environment, including U.S. Geological Survey (USGS) topography maps and the Geologic Map of Seattle (Troost et al. 2005) to determine regional soil type and conditions.

2.2.2 Historical Land Use

Understanding the previous uses of properties affected by a proposed project helps to identify the likelihood of encountering contamination that could affect the environment or the project's construction. Historical land use was reviewed to identify uses that are known to be associated with potentially contaminated sites. Historical records reviewed include Sanborn Fire Insurance Maps, which were obtained from Environmental Data Resources, Inc. (EDR).

2.2.3 Regulatory Records

Regulatory records, maintained in databases by EPA and the Washington State Department of Ecology (Ecology), were searched to identify past and current hazardous materials sites that could potentially pose risks to the project. These sites are suspected or known either to have released hazardous materials to the environment or to have a potential for release due to hazardous materials generation, handling, or use activities. Some of the information contained in the databases for each hazardous materials site includes the site location, the regulatory program under which the site is being addressed, the types and uses of hazardous materials at the site, the types of media (soil, groundwater, air, etc.) affected by hazardous materials releases, and (if applicable) the status of remediation activities.

A professional search company, EDR, was retained to perform the regulatory record database search and prepare a report for evaluation. The report is included as Attachment A. Table 2-1 shows the record sources searched, the agency that maintains the record source, the search radius (distance from the project footprint that was covered in the search), and a description of the data available from the source. A ¼-mile search radius was used for each database searched and is consistent with the selected study area.

Table 2-1. Standard Regulatory Record Sources

Record Source	Agency	Search Radius	Description
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)	EPA	1/4 mile	The CERCLIS database contains data on potentially hazardous waste sites that have been reported to EPA by states, municipalities, private companies, and private persons. It also lists sites that are either proposed for listing or are on the National Priorities List (defined below).
National Priorities List (NPL)	EPA	1/4 mile	The NPL is a subset of CERCLIS and identifies sites for priority cleanup under the Superfund program.
Delisted NPL	EPA	1/4 mile	This database includes sites that have been removed from the NPL.
CERCLIS No Further Remedial Action Planned (NFRAP) sites	EPA	1/4 mile	The CERCLIS NFRAP database contains data on CERCLIS sites for which no further remedial action is planned.

Table 2-1. Standard Regulatory Record Sources

Record Source	Agency	Search Radius	Description
Resource Conservation and Recovery Act (RCRA)	EPA	1/4 mile	The RCRA database includes selective information on small quantity and large quantity generators (RCRA SQG and RCRA LQG) of hazardous waste as well as treatment, storage, and disposal (TSD) facilities. If a site is identified as a RCRA generator, it does not mean that a release of hazardous materials has occurred at the site; however, the presence of these materials at a site increases the potential that a release could occur.
RCRA Corrective Action Sites (CORRACTS)	EPA	1/4 mile	The CORRACTS List identifies hazardous waste handlers with corrective action activity.
Emergency Response Notification System (ERNS)	EPA	1/4 mile	The ERNS records and stores information on reported releases of oil and hazardous substances.
Confirmed and Suspected Contaminated Sites List (CSCSL) and State Hazardous Waste Site (SHWS)	Ecology	1/4 mile	The CSCSL and SHWS is a listing of sites that is the state's equivalent to the federal CERCLIS list. These sites have known or suspected contamination. The type of media affected and type of contaminant are typically listed in the database.
Landfill and Solid Waste Facilities (State Landfill)	Ecology	1/4 mile	The state landfill records contain an inventory of solid waste disposal facilities or landfills in Washington. These may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.
Underground Storage Tank (UST) Database	Ecology	1/4 mile	The UST database contains information on the site location, number of tanks present, materials stored, dates of installation and removal, and other pertinent information for registered USTs. Sites identified in this database include only those registered with Ecology as containing regulated substances. This database does not include underground residential heating fuel tanks or tanks used for farm applications.
Leaking Underground Storage Tank (LUST) Site List	Ecology	1/4 mile	The LUST list contains an inventory of reported leaking UST incidents. The LUST list may also identify the type of material released and the affected media (e.g., air, soil, or water).
Brownfield sites	Ecology	1/4 mile	This is a listing of brownfield sites included in the CSCSL and SHWS list. Brownfield sites are abandoned, idle, or underused commercial or industrial properties whose expansion or redevelopment is hindered by real or perceived contamination.
Washington Independent Cleanup Report (WA ICR) Voluntary Cleanup Program (VCP) sites	Ecology	1/4 mile	The WA ICR lists sites that have submitted independent remedial action reports to Ecology. The VCP database includes sites that have been entered into the state VCP or its predecessor the Independent Remedial Action Program.

Additional databases were searched to supplement the standard regulatory information, as necessary. These additional databases included propriety databases from EDR (historical cleaners, historical automobile services, etc.) and state-specific databases, such as the SPILLS database. These databases were searched, along with those described above, to gain as much information as possible regarding the potential for identified sites to have impacts on the project. The full list of databases searched is included in the EDR report in Attachment A.

2.2.4 Site Ranking

Site ranking is primarily a tool to manage the enormous quantity of information obtained from the regulatory database search and to address the presumption that many of the sites identified are unlikely to have an impact on the project. Therefore, the ranking system was developed to identify those sites that are of most concern. Rankings were based on:

- Location of the site relative to the project footprint
- Type and number of regulatory record database listings for that site
- Occurrence of a known release of a hazardous substance(s) or petroleum product
- Status of cleanup—active, inactive, or unknown; all sites identified on regulatory databases are considered active unless identified as having no further action (NFA) or inactive status. An NFA determination is made by Ecology and provides the owner or responsible party with assurance that under specific assumptions, no further investigations or remedial actions are required by Ecology, and no unacceptable risk exists at the site under the current status or reasonably likely future use scenarios.

All of the information above was considered and the sites were ranked on a scale of 0 to 4 (lower priority concern to higher priority concern). The rankings are defined as follows:

0 – Identified site is outside the study area

1 – Identified site is within the study area, but is not known to have had a confirmed or suspected release

2 – Identified site is within or adjacent to the project footprint, but is not known to have a confirmed or suspected release

3 – Identified site is within the study area and has had a confirmed or suspected release

4 – Identified site is within or adjacent to the project footprint and has had a confirmed or suspected release

The definitions used for these rankings are consistent with the WSDOT Guidance for Hazardous Materials Discipline Reports (WSDOT 2009). The rankings of 0 to 2 were primarily used as a data management tool to limit the number of sites to be further evaluated. None of the sites ranked 0 to 2 are likely to have an impact on the project; therefore, these sites were not evaluated further. In general, the sites ranked 3 or 4 are of the greatest concern and were evaluated for this analysis.

2.2.5 Previous Environmental Documentation

The City of Seattle has undertaken previous environmental documentation that is relevant to the current analysis. The environmental information specifically provided by the City for this discipline report includes:

> Hazardous Materials Discipline Report, South Lander Street Grade Separation Project. Prepared by Herrera Environmental Consultants, Inc. March 5, 2008 Draft

In addition, at least seven Phase I environmental site assessments (ESAs) have been completed subsequent to the 2008 Draft Hazardous Materials Discipline Report and were used to further evaluate sites adjacent to the project footprint, as needed. The Phase I ESA Reports for the following properties were reviewed as part of this current assessment:

- Allied Waste Industries (2733 3rd Ave S). Herrera, January 2008
- Big O Tires (2701 4th Ave S). Herrera, December 2007 Draft
- Lander Station (151 S Lander St). Herrera, January 2008
- Pacific Galleries Antique Mall (241 S Lander St). Herrera, February 2008
- Seattle Public Schools (230 S Lander St). Herrera, January 2008
- Shell Station (2461 4th Ave S). Herrera, January 2008
- South Lander Business Park (2454 Occidental Ave S). Herrera, January 2008

The information in the Phase I ESA reports was used to supplement the evaluation of sites included in Section 3.2.1.

2.2.6 Site Reconnaissance

A survey of properties within the project footprint and immediately adjacent areas (a site reconnaissance) was conducted in August 2016 to evaluate the potential for environmental conditions that may represent potential areas where hazardous materials could be present. The site reconnaissance consisted of observing the areas in and immediately surrounding the project footprint, visiting representative areas of the project footprint, and visually assessing the areas for evidence of hazardous materials. The visual assessment included identifying evidence of chemical containers or drums, spills, leaks, stained soils, oil sheens, odors, potential polychlorinated biphenyl (PCB) sources, vegetation distress, USTs or other hazardous materials storage containers, and evidence of hazardous materials cleanup or monitoring projects (i.e., monitoring wells), as appropriate. All observations were conducted from public areas or right-of-way.

2.3 Identification of Impacts

Environmental regulations require consideration of a project's construction and operational impacts. The methodology used to evaluate construction and operational impacts is summarized in the following sections.

2.3.1 Construction Impacts

Construction impacts are defined as hazardous materials impacts that could arise as the project is being built. These potential impacts could include:

- Harm to project workers, the public, utilities, and the environment by exposing them to hazardous materials encountered or used during project construction
- Potentially subjecting the City of Seattle to liability for remediating a hazardous materials site acquired for the project
- Increasing project costs and delaying construction in order to properly manage hazardous materials encountered, used, or accidentally spilled during project construction in compliance with federal, state, and local regulations

Construction impacts were evaluated by first establishing the affected environment and then evaluating how construction might affect, or be affected by, existing hazardous materials sites. In general, adverse impacts could occur in areas where adjacent properties containing hazardous materials sites are currently located or were historically located.

2.3.2 Operational Impacts

Operational impacts were examined by evaluating the potential for hazardous materials to enter the environment as a result of project operation. In general, such potential impacts are expected to consist of:

- Changes in contamination migration pathways due to the installation of project-related utilities or other infrastructure
- Impedance of soil or groundwater cleanup due to the presence of project-related utilities or structures
- Maintenance worker health and safety
- Leaks and spills of hazardous materials by the traveling public and during project operation and maintenance

2.4 Identification of Avoidance, Minimization, and Mitigation Measures

Potential mitigation measures for identified impacts were identified by assessing the type of impact expected and outlining specific mitigation alternatives for that particular impact. Mitigation options are generally dependent on the type of impact identified, and may be achieved by one approach or a combination of measures.

2.4.1 Construction Avoidance, Minimization, and Mitigation Measures

The information presented in this report supports the development of construction approaches that allow impacts to be avoided (by avoiding construction in areas of contamination) or minimized (by protecting people and the environment during work in areas of known contamination).

In cases where project construction encounters contamination from an unidentified source, the approach for mitigation involves the use of best management practices (BMPs) at various phases of project development, including during final design, construction planning, and construction. In cases where project construction cannot avoid an identified hazardous materials site, mitigation may include:

- Conducting due diligence and site-specific environmental investigations (soil and groundwater sampling and testing) on adjacent property or within the right-of-way
- Coordinating and communicating with Ecology and other applicable agencies and potentially responsible parties
- Encouraging (or requiring) the potentially responsible parties to conduct cleanup, and conducting remediation or abatement of contaminated media

2.4.2 Operational Avoidance, Minimization, and Mitigation Measures

Mitigation measures were identified by assessing the type of operational impact expected and outlining specific mitigation options for that particular impact, such as BMPs for spill prevention and response.

3. AFFECTED ENVIRONMENT

The following sections describe the hazardous materials-related conditions that currently exist in the project study area.

3.1 Physical Environment

This section describes the environmental characteristics that affect the presence and movement of hazardous materials in the vicinity of the project footprint. Some of the information was obtained from the previous Hazardous Materials Discipline Report (Herrera 2008), and supplemented from other sources where deemed necessary.

3.1.1 Geologic Conditions

The project footprint and vicinity are relatively flat, with a slight gradient to the west towards Elliott Bay. The elevation of the study area ranges from approximately 10 to 20 feet above mean sea level (msl) and generally lies within the former floodplain of the Duwamish River and tide flats of Elliott Bay.

The area within which the project is located is known as the Duwamish Embayment, which is a deep trough eroded into glacially overridden soils that lies between Beacon Hill on the east and the West Seattle Ridge on the west. The deeply carved channel was filled over time by estuarine, alluvial, and deltaic sediments deposited as the delta of the Duwamish River advanced northward to its present location. After deposition, these soils were reworked by tidal processes and meandering streams, resulting in laterally discontinuous lenses of fine-grained and coarse-grained soils. The predominantly alluvial and deltaic deposits grade into and overlie fine-grained, estuarine sediment deposited in deeper, more distal portions of the delta (Shannon and Wilson 2007; Herrera 2008).

Shallow geology in the study area generally consists of deposits of fill, underlain by native alluvial and estuarine soils. This includes soils dredged from the Duwamish East Waterway and granular or cohesive fill material excavated from surrounding areas of higher elevation. The average thickness of the fill in the project area is approximately 10 feet, and has been reported to extend up to approximately 20 feet. The fill generally consists of silty/clayey sand, non-plastic silt, compressible silt and clay, and refuse such as brick, glass, wood debris, and sawdust. In addition, cobbles and boulders and/or concrete construction debris may exist within the fill (Troost et al. 2005). Underlying the fill are interbedded alluvial and estuarine deposits. The alluvial deposits generally consist of fine-to-medium sand and silty sand. The estuarine deposits are generally finer grained consisting of sandy silt to clayey silt. Both the alluvial and estuarine deposits can contain shell fragments and fine organics.

3.1.2 Hydrogeological Conditions

Groundwater in the project area is primarily recharged by direct infiltration from precipitation and surface runoff. The depth to groundwater ranges between 7 and 8 feet below ground surface (bgs) within the project footprint. The regional groundwater flow direction is expected to be to the west toward the Duwamish Waterway. However, groundwater flow can be variable and is subject to tidal influences from Elliott Bay. There are no wetlands or surface water bodies mapped within the study area (USGS 1983). Stormwater runoff is generally directed to stormwater system infrastructure along S Lander St and adjacent roadways and ultimately to the Duwamish Waterway, approximately 2,000 feet to the west.

3.1.3 Historic and Current Land Use

This section provides information on sites that, based on historic or current land use, have the potential to have contamination that could result in construction and operational impacts.

3.1.3.1 Historic Land Use

Sanborn Fire Insurance Maps are historic maps that were developed for many cities from the turn of the 20th century to the late 1960s to document fire risk. The maps are useful for hazardous materials studies because they identify land occupancy and use, which can be an indicator of potential past contamination. Reviewing maps from different years for the same property gives an idea of the longevity of different businesses and industries and therefore of the potential for the businesses or industry to have released contaminants.

The 2008 Hazardous Materials Discipline Report (Herrera 2008), which was used as an information source for historical land use, included a previous review of Sanborn maps. However, the Sanborn maps were reviewed independently during this current study to confirm the original interpretation or information related to historic land use.

Sanborn maps were obtained from EDR and cover much of the project footprint and some adjacent portions of the study area. The maps available were for 1904, 1916, 1950, and 1969, thereby providing a representative sampling of activities in the study area over time. The maps are included in Attachment B.

Review of the Sanborn maps indicates that land use in the project vicinity has been predominantly industrial for at least the last 60 years. The maps indicate that the area east of Occidental Ave S was historically tide flats and that this area was filled during the early 1900s for development. The Northern Pacific Railroad is shown as crossing S Lander St on the earliest available Sanborn map from 1904.

A variety of industrial and commercial operations are noted in the historical review, specifically along S Lander St. As early as the 1920s, automotive repair services and gasoline stations were located in the area (Herrera 2008). As noted in the 2008 Hazardous Materials Discipline Report and confirmed during this current study, commercial and industrial businesses that developed along S Lander St have included the following:

- Railroad maintenance facilities
- Manufacturing companies (e.g., wire works, plating facilities, sheet metal works, electrical equipment)
- Junk yards
- Livestock storage yards
- Former landfill located east of 6th Ave S
- Commercial bakeries
- Gasoline service stations, commercial fueling stations, automobile/truck repair shops
- Truck motor freight businesses and repair services
- Car/truck wrecking yards
- Shopping centers and bulk purchase stores
- Machine shops

Many of these types of facilities have the potential to have affected environmental conditions within or near the project footprint. Specifically, the common use of USTs for commercial gas stations and automotive shops, as well as industrial facilities, is of some concern. In addition, hazardous materials are common to many industrial operations, such as machine shops, maintenance facilities, freight businesses, and wrecking yards. Past management or disposal practices related to these substances are not known.

3.1.3.2 Current Land Use

The project footprint and study area are shown on Figure 2-1. Figure 2-1 also includes business names or land uses within and along the project footprint. In general, land use within and adjacent to the project footprint is heavily developed with retail/commercial and industrial properties, and includes infrastructure such as roadways, utilities, sidewalks, and parking areas. A key component of the area is the presence of the BNSF/Amtrak/Sounder railroad that cross S Lander St in the approximate center of the project footprint. A large rail yard is located to the west of the project footprint, west of Colorado Ave S.

Specific land uses on the northern side of S Lander St from 1st Ave S to 4th Ave S include light industrial businesses, the South Lander Business Park (office/commercial), the Seattle Public Schools John Stanford Center for Educational Excellence, and a Shell gas station (Figure 2-1). Specific land uses on the south side of S Lander St from 1st Ave S to 4th Ave S include commercial/office buildings, the Pacific Galleries Antique Mall, and a Pep Boys automotive store (Figure 2-1). Other notable land uses near the project footprint includes the large Republic solid waste recycling facility to the south, a U.S. Post Office facility to the east, a Sound Transit light rail line and station farther east, and a large rail yard to the west (west of Colorado Ave S).

The area has been historically industrial, but has been changing in recent years to more commercial and retail businesses. However, the area still maintains an industrial feel, and railroad tracks dominate the area as they cross S Lander St between Occidental Ave S and 3rd Ave S, and adjacent to the SODO Busway.

3.2 Hazardous Materials Sites Identified in Regulatory Databases

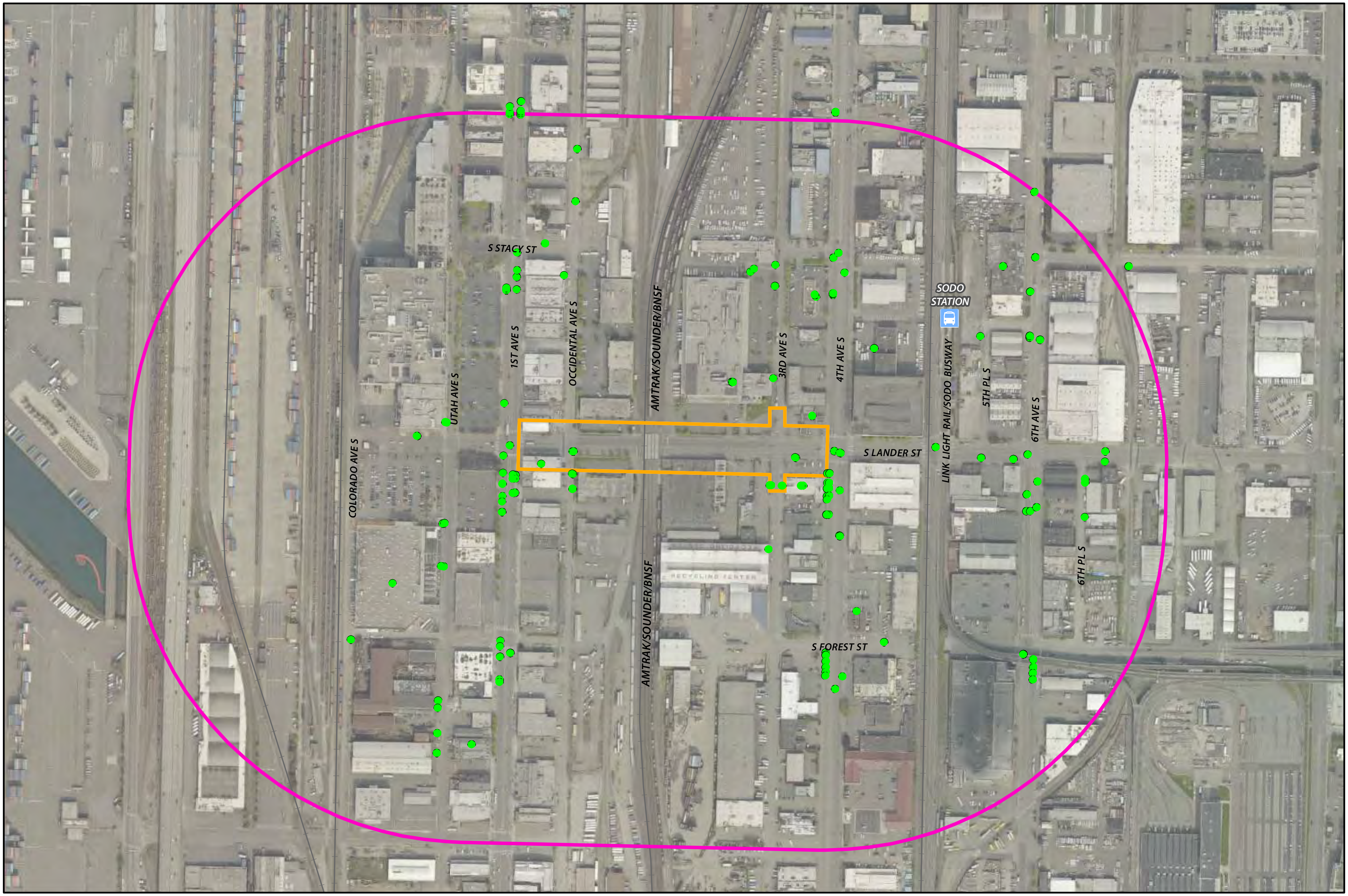
This section provides information on known or suspected sites at which contamination could result in impacts during project construction and operation.

3.2.1 Regulatory Database Search Results

A database search conducted by EDR identified over 120 unique hazardous materials sites within the ¼-mile study area, each one identified on one or more of the regulatory databases reviewed. The EDR report is included as Attachment A. Figure 3-1 shows all the sites identified by EDR within the study area.

Many of the databases did not specify an environmental issue or concern for a given site. Therefore, the large number of regulatory database sites was further evaluated to develop a list of sites with the highest potential for impact. As discussed in Section 2.2.4, a ranking system was developed to assess the likelihood of adverse impacts on the project. In general, the ranking system used the distance from the project footprint and the nature of the database (reported or suspected releases) to apply an appropriate rank on a scale of 1 (low) to 4 (high).

Sites ranked 1 and 2 generally are expected to present little or no risk to the project, and were not evaluated further. Sites ranked 3 or 4, which have the potential to result in adverse impacts, were carried forward for further evaluation.



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Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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- Regulatory Database Sites (All)
- Project Footprint (Approximate)
- 1/4-mile Study Area

Figure 3-1
Regulatory Database Sites

S Lander St Grade Separation

3.2.2 Sites Identified for Further Evaluation

Table 3-1 shows the sites within the study area that were initially ranked a 3 or 4, which includes a total of 60 unique sites. Some of the sites are listed on multiple databases; therefore, the total number of sites shown in Table 3-1 is greater than the total number of unique sites within the study area. The sites that were ranked a 3 or 4 are shown on Figure 3-2.

Table 3-1. Sites on Regulatory Databases Ranked as 3 and 4

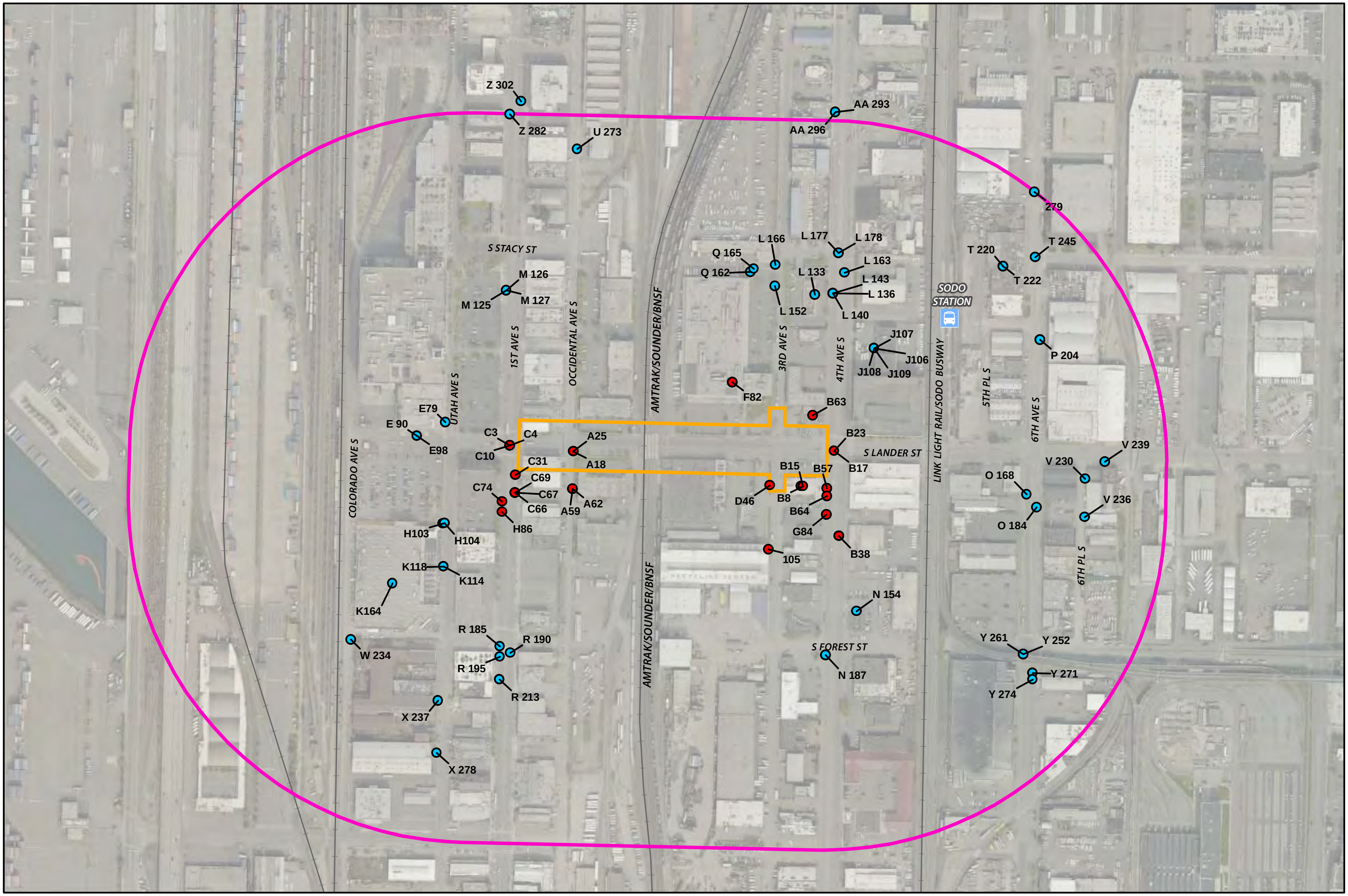
Database	Within or Adjacent to Project Footprint	Within Study Area
Ecology Databases		
LUST	2	11
UST	2	25
CSCSL	2	17
CSCSL-NFA	0	11
SPILLS	5	21
VCP	0	6
Brownfields	0	0
ICR	1	16
EPA Databases		
NPL	0	0
Delisted NPL	0	0
CERCLIS	0	0
CERCLIS-NFRAP	0	0
CORRACTS	0	0
RAATS	0	0
RCRA (LQG, SQG, CESQG)	1	9
ERNS	0	3
TOTAL	**13**	**119**

Further evaluation was completed for each site with an initial ranking of 3 or 4 to compile a final list of sites that are of the highest potential concern (i.e., some sites initially ranked a 3 may be elevated to a 4 based on specific conditions). The evaluation included information on the extent and nature of previous releases, as well as the distance from the project footprint; a greater weight was placed on sites close to the project footprint. In most cases, sufficient information was included as part of the regulatory database report provided by EDR to make a reasonable assessment of the site's potential impact on the project. However, in some cases, the EDR information was limited, and additional information was obtained to refine the evaluation. Based on this additional evaluation, 21 sites were ranked as 4. These sites, which have the highest potential to impact the project, are listed in Table 3-2 and shown on Figure 3-2.

Most of the sites shown in Table 3-2 and on Figure 3-2 were ranked as 4 solely on the basis of their proximity to the project footprint. Therefore, the sites were further evaluated to determine sites of highest concern and potential impact. As noted in Table 3-2, eight of the sites were listed in the SPILLS database and generally include localized small (less than 5 gallons) spills, many of which were on impermeable surfaces. These sites should be considered during planning work, but any impacts are expected to be minimal. Additional file information for two sites, Western Petroleum and Elephant Car Wash, indicated that both

Table 3-2. Identified Sites with the Highest Potential to Impact the Project (Sites Ranked as 4)

Map ID	Site Name or Previous Site Name	Address	Ecology Cleanup Site ID#	Potential Contaminants	Notes
105	Cleanscapes	2801 3rd Ave S	SPILLS	Hydraulic Oil	5 gallons, contained
A18	Line Segment	2700 Occidental Ave S	LUST #9471 UST #9451	Petroleum	ICR 1995 May be same as Map ID A25
A25	BNR Occidental	2700 Occidental Ave S	ICR	Petroleum	UST 1995, ICR 1999 Final cleanup report. Limited soil and groundwater issues located downgradient or cross gradient and more than 400 feet away from right-of-way.
A59/62	Utility Seattle City Light	2750 Occidental Ave S	SPILLS	Transformer Oil	2 gallons, 2001
B15/B8	Bill Bailey Pep Boys Big O Tires Pyramid Tires	2701 4th Ave S	LUST #8351 LUST #4167	Petroleum fuels	ICR 2011 NFA not identified
B17	Unknown	S Lander St and 4th Ave S	SPILLS	Non-oil from train	Railroad track bed, 2016
B23	Unknown	S Lander St and 4th Ave S	SPILLS	Unknown	Reported 2008
B38	Newall Properties	2730 4th Ave S	LUST #1707	Petroleum	ICR 2016 Cleanup reported
B57	Western Petroleum	2739 4th Ave S	LUST	Petroleum	CSCSL NFA 2011 Cleanup reported
B63	Texaco #0043	2461 4th Ave S	ICR	Petroleum	Reported 1996 Some cleanup actions
B64	J&B Mobile Repair	2747 4th Ave S	UST #2469	Petroleum	No release reported
C10	Unknown	1st Ave S and S Lander St	SPILLS	Unknown	100 gallons, storm drain pipe
C3	Pepsi	1st Ave S and S Lander St	SPILLS	Unknown	On impermeable roadway
C31	Evergreen Computer	2720 1st Ave S	VCP #11151	Petroleum, diesel	Independent cleanup NFA not identified
C4	King County Metro	1st Ave S and S Lander St	SPILLS	Petroleum, oil	2 gallons, impermeable surface
C66/67/69	Chevron 9168	2740 1st Ave S	VCP #5982 LUST	Petroleum	NFA 2009
C74	Chevron	2751 1st Ave S	ICR	Petroleum	Appears cleaned up; ICP report in 1993
D46	Rabanco	2733 3rd Ave S	SPILLS	Unknown	3 gallons
F82	Seattle Public Schools U.S. Post Office	2445 3rd Ave S	CSCSL #6720 LUST #6720 SPILLS	Petroleum	Remedial actions occurred; NFA not reported
G84	Elephant Car Wash	2763 4th Ave S	UST #4916 CSCSL #10992	Petroleum	ICR 1993 NFA 2011
H86	Sears Roebuck	2759 1st Ave S	CSCSL #4669	Petroleum	



0 500 1,000 Feet

- Hazardous Materials Sites Ranked 3
- Hazardous Materials Sites Ranked 4
- Project Footprint (Approximate)
- 1/4-mile Study Area

Figure 3-2
Hazardous Materials Sites Ranked 3 or 4

S Lander St Grade Separation

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have a No Further Action (NFA) determination. Therefore, these sites are also unlikely to result in environmental impact. Several other sites appear to have been in Ecology's Independent Cleanup Report pathway. File information suggests that at least some cleanup has been completed and widespread contamination is not expected. However, residual contamination should still be considered a potential impact to the project footprint.

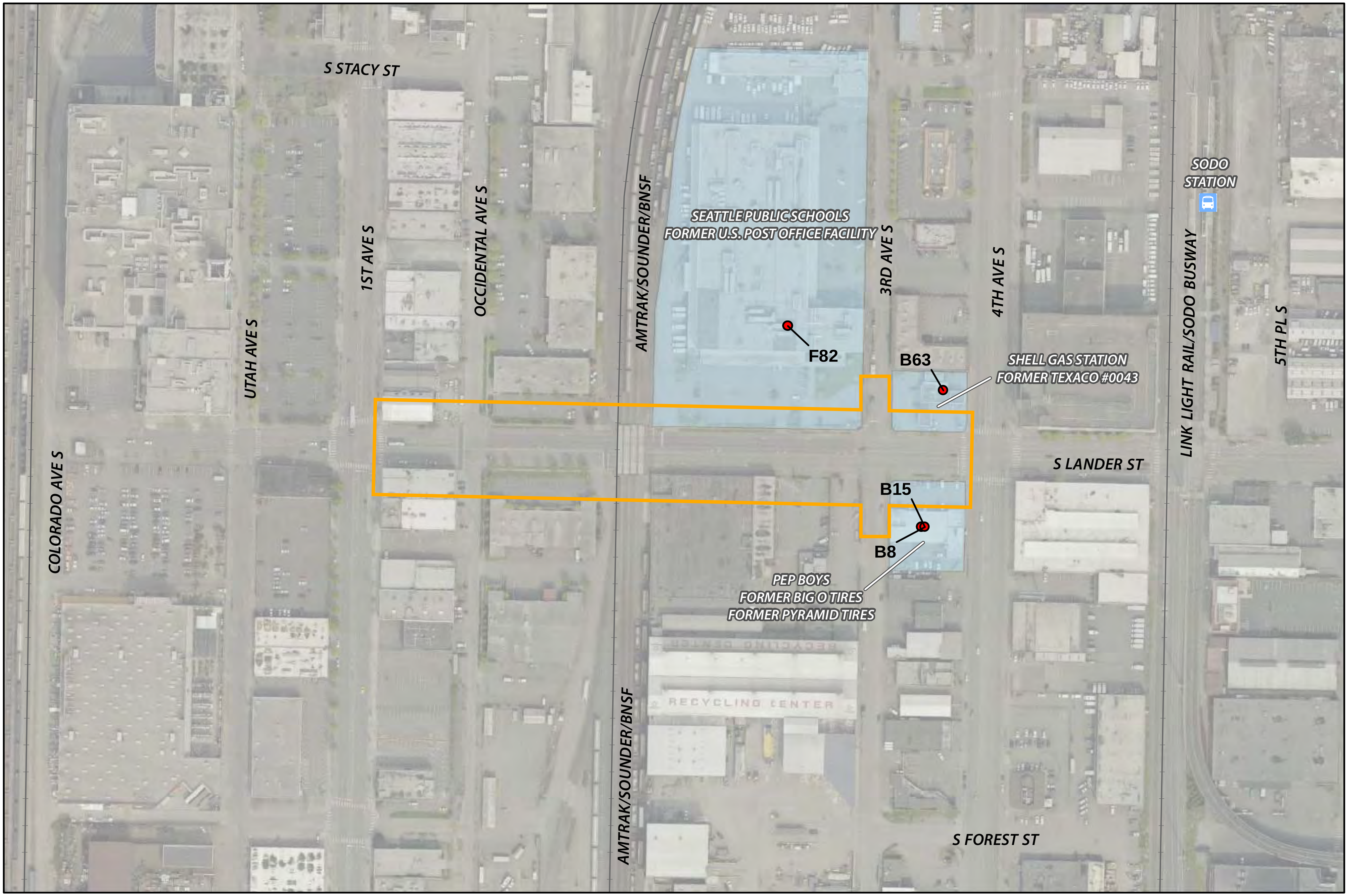
3.2.3 Sites of Highest Concern

Detailed review of the sites in Table 3-2 indicates that three properties ranked as 4, shown in Figure 3-3, pose the highest level of environmental concern with regard to the project. These sites were also identified as being of the greatest concern in the 2008 Draft Hazardous Materials Discipline Report (Herrera 2008). The three sites are discussed below.

Map ID B15/B8, Pyramid Tires (currently Pep Boys), 2701 4th Ave S (Ecology LUST #8351 and #4167). Based on information from a 2008 Phase I ESA for the property, a gas station and car lot office were constructed on the site in 1936 and operated at least into the 1950s. Information suggests that two 550-gallon USTs, a 1,000-gallon UST, and a hydraulic hoist were identified on the site in 1936 and five 4,000-gallon USTs and a hydraulic hoist were identified on the property in 1948. A series of tire businesses, including Fleet Service Tire Company, Firestone Truck Tire Center, Pyramid Discount Tires, and Big O Tires occupied the site from the late 1940s to approximately 2010; Pep Boys is the current occupant. Two separate LUST files (#8351 and #4167) are associated with the site. It appears that some cleanup has occurred on the property, but the files have not yet been closed by Ecology. Based on information from the City, Ecology was in the process of preparing a Site Hazard Assessment, but it was not completed due to lack of sufficient information. The exact location of the LUSTs are not known; however, based on the property configuration (past and present), the various USTs may have been less than 50 feet from the right-of-way. In addition, groundwater in this area is very shallow (approximately 7 feet) and flows to the west. The LUST files and the historical operation of gas station and automotive services indicate that residual petroleum-contaminated soil and/or groundwater may still be present in the vicinity of the project footprint.

Map ID B63, Texaco #0043 (currently Shell gas station), 2461 4th Ave S. This property is currently a Shell gas station and is listed on the ICR, LUST, and UST databases. Based on information in a 2008 Phase I ESA, four 10,000-gallon USTs (three gasoline and one diesel fuel) and one used oil UST were removed in 1992. Eight groundwater monitoring wells had been installed at the site by 2001 (currently includes 11 monitoring wells). Recent sampling in 2015 has indicated the presence of gasoline-range hydrocarbons and benzene exceeding MTCA cleanup levels, including in monitoring wells on the southern portion of the property near the existing S Lander St right-of-way. Maximum concentrations of gasoline-range petroleum hydrocarbons and benzene are 4,100 µg/L and 22.4 µg/l, respectively. Groundwater at this site reportedly flows to the west-southwest (AECOM 2016), towards the S Lander St right-of-way, and is present at approximately 6 feet below ground surface. The site's history of contamination and the fact that it is adjacent to the project footprint indicate that excavation in this area could encounter contaminated soil and/or groundwater. In addition, operation of the current fueling system at the property represents a potential ongoing environmental concern.

Map ID F82, U.S. Post Office (currently Seattle Public Schools John Stanford Center for Educational Excellence), 2445 3rd Ave S (Ecology CSCSL #6720). This site, which is currently occupied by the Seattle Public Schools headquarters, was formerly a U.S. Post Office distribution facility listed on the ICR, CSCSL-NFA, and RCRA-SQG databases. Maintenance and servicing of U.S. Postal Service vehicles occurred at this site from the mid-1950s until approximately 2000, and several USTs provided fuel for the fleet.



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- Hazardous Materials Sites Ranked 4
- Project Footprint (Approximate)
- Study Area
- Sites of Highest Concern

Figure 3-3
Sites of Highest Concern

S Lander St Grade Separation

Based on information in the 2008 Phase I ESA conducted for this site, a leaking unleaded gasoline UST was identified in 1983, and in 1984 a leaking diesel fuel UST was identified in the northern portion of the property. In 1987, a groundwater interception trench and free product recovery system and monitoring wells were installed at the request of Ecology. The free product recovery system was shut down in 1988 with Ecology approval due to poor performance. In 1988, two gasoline and one diesel fuel USTs were removed from the site, and one 12,000-gallon diesel fuel UST was installed in the former UST excavation. Additional subsurface work at the property identified a potential hydraulic lift leak in the vehicle maintenance facility. In 1994, the 12,000-gallon diesel fuel UST installed in 1988 and a 500-gallon waste oil UST were removed from the property, along with approximately 1,200 tons of contaminated soil.

Groundwater beneath the site was found to be contaminated with benzene, toluene, ethylbenzene, and xylenes (BTEX); gasoline-range hydrocarbons; diesel-range hydrocarbons; and polynuclear aromatic hydrocarbons (PAHs). In 1999, Ecology issued an NFA letter and restrictive covenant for the site. The letter specified that annual groundwater monitoring in the former hydraulic lift area be continued for carcinogenic PAHs (cPAHs) until concentrations fell below MTCA Method B cleanup levels. By 2003, cPAHs were still detected at concentrations above the cleanup level. Ecology prepared a 5-year Periodic Review for the site in November 2016 (Ecology 2016). The report indicates that the last groundwater monitoring data received by Ecology was in May 2006, and confirmed that soil and groundwater have been impacted above cleanup levels and likely remain at the site. The report also indicates that a restrictive covenant has been placed on the site and includes building and asphalt over the impacted areas to mitigate any potential on-site risk. The site's history of contamination and the fact that it is adjacent to the project footprint indicate that excavation in this area could encounter contaminated soil and/or groundwater. However, based on the groundwater flow to the west, distance of the known sources (waste oil tank, fuel USTs, etc.) from the right-of-way (north of right-of-way approximately 250 to 500 feet), and the monitoring conducted through 2006, the potential for these sources to have impacted the right-of-way at significant concentrations is low.

3.3 Site Reconnaissance

A site reconnaissance was conducted on August 10, 2016, to view properties within the project footprint and adjacent areas. The reconnaissance was completed in an effort to further evaluate the potential for environmental conditions that represent areas where hazardous materials may be present. Such environmental conditions or areas might include chemical containers or drums, spills, leaks, stained soils, oil sheens, odors, vegetation distress, aboveground storage tanks (ASTs) or USTs, or other hazardous materials storage containers. Private property was only inspected from public rights-of-way or other publicly accessible areas.

The analysts recorded field notes regarding the types of structures observed, land use or property tenants, observations related to environmental conditions, and confirmation of hazardous materials (database) site locations.

The majority of the project footprint and adjacent areas consists of railroads, streets, industrial facilities, commercial buildings, office buildings, and parking lots. In general, the reconnaissance did not identify visual evidence suggesting significant potential concerns related to hazardous materials. ASTs and evidence of USTs were also not observed within or near the project footprint. In addition, evidence of leaks or spills, soil staining, or stressed vegetation were not observed. Minimal amounts of oil staining were observed on the pavement and in roadways.

4. CONSTRUCTION IMPACTS AND MITIGATION MEASURES

The potential release or encounter of hazardous materials during construction can result in risk to human health or the environment, create potential liability, increase project costs, and cause schedule delays. For the S Lander St Grade Separation Project, the potential impacts of construction arising from hazardous materials-related conditions could include:

- Exposure to property acquisition liability
- Impacts on the environment from construction activities in areas where hazardous materials may exist
- Impacts related to releases of hazardous materials used in the construction process

For purposes of this discipline report, "hazardous materials" means hazardous substances, hazardous wastes, and contaminated soil and groundwater. Hazardous materials impacts are the impacts that existing hazardous materials could have on the project, as well as hazardous materials-related impacts the project could have on the natural and built environment. The term "hazardous materials" used in this report is separate and distinct from the language used in the City's safety procedures for construction work.

The following sections discuss the potential construction impacts of the project and the mitigation measures identified for these impacts.

4.1 Property Acquisition

Acquisition of property with hazardous materials-related conditions can expose the party acquiring the property to liability for the hazardous material and an obligation to take action with respect to those conditions. Liability and obligations associated with contaminated property can include 1) restrictions on current or future property use; 2) incurring costs for cleanup; 3) schedule delays; 4) worker and public safety hazards; or 5) increased resource agency oversight.

Typically, the property acquisition process includes the completion of environmental due diligence on properties to be acquired. The focus of environmental due diligence is to determine the potential for acquiring environmental liability (such as for existing contamination, current operational practices, and construction worker health and safety) associated with a particular property. This due diligence typically includes the completion of Phase I and, as appropriate, Phase II ESAs. Phase I ESAs are completed in accordance with ASTM E1527-13 (ASTM 1527), *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* and are an assessment of potential environmental liability associated with a property or properties. They are generally non-intrusive investigations that include review of historical land and operational use and regulatory databases, as well as site reconnaissance. Phase II ESAs include the collection of environmental media, such as soil, groundwater, soil gas, indoor air, and surface water samples, to assess environmental conditions on a property. In some cases, the City may develop a Memorandum of Agreement with the property owner or responsible party to address environmental contamination encountered in an acquired property.

Based on the latest design, permanent right-of-way acquisitions are anticipated on the edges of five parcels, totaling approximately 2,100 square feet. Four of the acquisitions would occur near the S Lander St/3rd Ave S intersection and one acquisition would occur on the southwest corner of the S Lander St/4th Ave S intersection. In addition, it is anticipated that seven temporary construction easements (TCEs) totaling approximately 34,200 square feet will be required; however, it is not expected that the City would be liable for any contamination encountered on the TCEs.

4.2 Impacts from Project Construction

The project has the potential to encounter hazardous materials such as petroleum products during construction. As described in Section 3, there have been a variety of past and present industrial and commercial operations as well as railroad use in the project area. As a result, potential construction impacts could include the exposure of workers or the public to:

- Contaminated soil and groundwater within the right-of-way
- Hazardous materials contained in undocumented USTs within the right-of-way
- Construction-related spills or releases

While low levels of contaminants could be present in soil and groundwater throughout the project footprint, given the area's history of industrial development, the likelihood of encountering contamination is greatest in the vicinity of the three sites of highest concern. All of these sites are located east of the BNSF tracks and are contiguous with the S Lander St right-of-way. Most of the excavation in this area would be relatively shallow (to a depth of approximately 10 feet) and would take place for Geofoam approaches, sidewalk and driveway improvements, utility relocation, signage, and paving. Excavations for bridge footings (approximately ten piles) are anticipated to reach 130 feet below current ground surface.

Hazardous materials that could be encountered adjacent to these areas within the right-of-way, based on the records identified in Section 3.2.3 and Figure 3-3, include petroleum hydrocarbons and associated compounds at the sites on the northwest and southwest corners of 4th Ave S and S Lander St (Texaco and Pep Boys). In particular, the Texaco site has the highest potential for encountering impacted soil or groundwater, as gasoline and benzene contamination has been documented in groundwater on the property exceeding MTCA cleanup levels and within 20 feet of the right-of-way. In addition, the Texaco property is an operating gas station with a long history of use and known soil and groundwater impacts. Similarly, the Pep Boys site has a long history of auto maintenance and associated use and operation of several USTs, including past documented soil and groundwater impacts. The proximity to the right-of-way suggests that residual soil or groundwater contamination may be encountered. At the Seattle Public Schools John Stanford Center for Educational Excellence (formerly U.S. Post Office) site, potential contaminants that could be encountered include BTEX; gasoline-range hydrocarbons; diesel-range hydrocarbons; and PAHs. However, based on the location of the former USTs and cleanup areas relative to the right-of-way, the potential to have impacted the right-of-way with significant concentration of contaminants from these specific sources is relatively low. Because some cleanup activities have occurred on two of these sites (Seattle Public Schools and Pep Boys) and contaminant levels have been documented as declining in the third (Texaco), the degree of contamination is not expected to be severe in the areas where excavation is anticipated. In general, construction site workers are most likely to be exposed to contaminants, which could be minimized as described in Section 4.3.2.

Although there are no existing or former USTs documented within the project footprint, the potential exists that undocumented USTs may be encountered during construction. Damage to a UST in which the contents had not been completely removed could result in a release of hazardous materials. If a UST is encountered during construction activities, the UST must be reported to Ecology and the appropriate assessment process, including an evaluation of responsibility, must be followed. Activities that may have substantial impact on the project schedule could include UST decommissioning, soil and/or groundwater sampling, and soil and/or groundwater cleanup (including the potential for ongoing remediation and monitoring). Work within TCEs outside the project footprint would include measures to protect any identified USTs located on private property.

The potential also exists for hazardous materials to be released into the environment by construction equipment and materials. This generally results from the improper transfer of fuels or from spills. Pollutants such as paints, acids for cleaning masonry, solvents, raw concrete, and concrete-curing compounds, are anticipated be used during construction and may enter the environment if not managed correctly. Construction equipment could potentially track and spread contaminated soils offsite, unless properly managed. In addition, during construction there is a potential for waste materials (e.g., oil and grease) from construction equipment to enter stormwater runoff from the site. Contaminated stormwater runoff could affect groundwater if soils are exposed where existing paving has been removed, or could reach the Duwamish Waterway through stormwater drainage infrastructure.

4.3 Construction Avoidance, Minimization, and Mitigation Measures

To mitigate the potential construction impacts, the City would prepare and implement the plans, programs, and procedures described below. These plans, programs, and procedures are standard industry practice for construction activities occurring in areas with a high potential for hazardous materials-related conditions to be encountered during construction. Many components of these plans and programs are required by federal, state, and local regulations. In general, the plans and programs identify potential hazards; designate personnel responsible for hazardous materials management; and establish uniform procedures for managing contamination when it is encountered, including protocols for sampling, handling, and disposal. Table 4-1 provides a summary of potential construction impacts and mitigation measures.

The City of Seattle would prepare and implement plans pursuant to the Seattle Stormwater Code, the Seattle Stormwater Manual, the NPDES Construction Stormwater General Permit, and the Seattle Standard Plans and Standard Specifications for Road, Bridge, and Municipal Construction (2014) that describe BMPs to prevent pollution, control stormwater flows, and protect resources during construction. The plans would consist of a Spill Plan and a Construction Sediment and Erosion Control Plan.

4.3.1 Underground Storage Tank Procedures

Although USTs were not identified within the project footprint, the potential exists for undocumented USTs to be located there. USTs encountered during project construction may be removed or protected and maintained (if allowed and feasible) during project construction. UST removal conducted by the City of Seattle would comply with applicable Ecology UST reporting and removal regulations.

4.3.2 Health and Safety Plan

Project-wide construction health and safety plans (HASPs) minimize the potential for exposure of construction workers to hazardous materials and the risk to human health and the environment. HASPs are required by both federal OSHA regulations and Washington Industrial Safety and Health Act (WISHA) regulations. The project-wide HASP for the S Lander St Grade Separation Project would include information on potential hazardous materials that may be encountered, appropriate personal protective equipment (PPE), worker safety procedures for handling of media and hazardous materials, exclusion zone procedures, and training or certification requirements for workers.

4.3.3 Contaminated Media Management Plan

A site-specific contaminated media management plan (CMMP) ensures proper characterization, management, storage, disposal, and reporting of hazardous materials encountered during construction activities. CMMP's typically outline the roles and responsibilities of personnel; health and safety requirements; methods and procedures for characterizing, managing, storing, and disposing of waste; and reporting requirements. In general, a CMMP would only be utilized if it is determined to be necessary after further evaluation of site conditions.

Table 4-1. Hazardous Materials Construction Impacts and Mitigation Measures

Impact or Issue	Location	Identified Construction Impacts	Recommended Mitigation Measures
Property acquisition	Project-wide	Acquisition liability in the event of acquiring a hazardous materials site or property impacted by a hazardous material site.	• Conduct appropriate due diligence investigations before acquiring potentially contaminated property. • City may develop a Memorandum of Agreement with the property owner or responsible party to address environmental contamination encountered in acquired property.
Potential for encountering USTs	Project-wide	This can include previously abandoned or decommissioned USTs within the project footprint.	• Develop a protocol in the event unknown USTs are encountered during project construction, including protocols for communications with the project team, Ecology, and other regulatory agencies.
Encountering contaminated soil or groundwater during construction	Project-wide; highest potential for encounter with the right-of-way in areas east of the railroad tracks	Spreading or improperly handling soil or groundwater contaminated with known or suspected petroleum products and PAHs.	• Develop and implement a site-specific contaminated media management plan for identifying, testing, storing, handling, and disposing of soil and groundwater known or suspected of being contaminated, if determined to be necessary based on further examination of site conditions. • Develop and implement a project-wide health and safety plan that addresses all potential contaminated media and contaminants, including requirements for PPE, exclusion zones, and/or worker training.
Spills of hazardous materials during construction or staging activities	Project-wide	Potential for accidental spill of hazardous materials during construction activities.	• Develop and implement a site-specific Spill Plan to address the use, storage, and disposal, as well as the prevention and response to potential releases, of hazardous materials used or encountered during project staging and construction. • Develop and implement a site-specific Construction Stormwater and Erosion Control Plan to prevent or minimize the potential for stormwater to carry contaminated soil and sediment into surface water or groundwater.

4.3.4 Spill Plan

A site-specific Spill Plan would address the use, storage, and disposal of hazardous materials used during project staging and construction. Such materials could include asphalt, fuel, raw concrete, solvents, paint, landscaping chemicals, and other materials whose release could affect human health and the environment. The Spill Plan would also address the prevention of and response to potential releases of hazardous materials used or encountered during project staging and construction.

4.3.5 Construction Sediment and Erosion Control Plan

A site-specific Construction Sediment and Erosion Control Plan would identify BMPs to prevent or minimize the potential for stormwater to transport contaminants into surface water or groundwater during project construction. If construction conditions require dewatering, the water generated would be managed, handled, and discharged or disposed of in accordance with a King County Wastewater Discharge Permit and other applicable requirements. This may include, but is not limited to, planning and design for treatment of water, obtaining appropriate disposal or discharge permits, and compliance sampling and reporting.

5. OPERATIONAL IMPACTS AND MITIGATION MEASURES

5.1 Impacts from Project Operation and Maintenance

Operation of the S Lander St Grade Separation Project is not expected to affect existing hazardous materials known to exist in the soil or groundwater on adjacent properties. However, the operation of new facilities installed underground, such as utilities, could have impacts on future cleanup efforts. New bridge foundations and support elements, pipelines, and conduits could physically impede cleanup of soil or groundwater, requiring either that the contamination be left in place or that the cleanup operation take extra measures to protect and support the utilities. Linear underground utilities can also act as conduits for the movement of soil or groundwater contamination due to the typical use of relatively porous fill materials as backfill for utility trenches. This practice could lead to the transport of existing contamination to less contaminated areas, with the result that future projects or cleanup efforts could encounter contaminants in unexpected places or at higher than expected levels.

Potentially contaminated soils or groundwater on adjacent properties and within the right-of-way could also affect maintenance activities for the completed project. Where maintenance activities require excavation, existing soil, or groundwater contamination could create unsafe conditions for workers and the public.

Operation of the S Lander St Grade Separation Project may result in the release of hazardous materials into the environment from accidental spills. Such releases would primarily be related to vehicle accidents, or spills occurring as a result of maintenance work utilizing hazardous materials. Fuel or hazardous materials, if accidentally released, could migrate to surface water or groundwater and affect properties outside of the right-of-way. Impacts could include road closures and delays, cleanup costs, and regulatory fines. Stormwater could carry these materials from S Lander St to surface water or groundwater, where they can persist and accumulate for long periods and harm the natural environment. However, because construction of the project would improve traffic operations, reduce congestion, and separate vehicles from crossing the railroad tracks, fewer accidents are expected, and therefore less risk of spills. The City of Seattle has a Spill Reponses Program in place as part of their overall Stormwater Management Plan. No long-term effects are anticipated.

5.2 Operational Avoidance, Minimization, and Mitigation Measures

In general, operation and maintenance of the project would not substantially change the risk of releasing contaminants into the environment. Maintenance activities would have a similar risk of exposing contaminants as they do today, and the potential for accidental spills would be reduced because of the improvement in traffic operations. As a result, no mitigation would be required. However, the use of BMPs, as shown in Table 5-1, can further minimize the potential for impacts.

Table 5-1. Operational Impacts and Mitigation Measures

Impact	Location	Identified Operational Impacts	Recommended Mitigation Measures
Maintenance of roadways and stormwater and utility systems	Project-wide	Contaminants could be encountered during maintenance of roadways and stormwater and utility systems.	• If determined to be present, inform maintenance personnel of known hazardous materials-related conditions they might encounter within the right-of-way. • Train personnel in appropriate protection measures for hazardous materials-related conditions. • For work in areas within the right-of-way known to be contaminated, use personnel who have received the appropriate level of hazardous waste operations training. • Develop protocols for appropriate coordination with and reporting to oversight agencies regarding encountered hazardous materials.
Spills of hazardous materials	Project-wide; incidence of spills is likely to be less due to decreased congestion	Vehicular accidents could result in spills on or near S Lander St. Spills could occur as a result of maintenance work utilizing hazardous materials.	• For worker safety, train maintenance personnel that might use hazardous materials in the hazardous communication and Globally Harmonized System of Classification and Labeling of Chemicals. • Implement BMPs to prevent or minimize the effects of spills. • Train maintenance personnel in the use of spill kits for responding to spills of hazardous materials used for maintenance work. • Develop protocols for responding to hazardous materials spills too large to be managed by spill kits. • Develop protocols for appropriate coordination with and reporting to oversight agencies regarding spilled hazardous materials.
Operation of new underground facilities, including utilities, pipelines, conduits, and foundations	Project-wide	New underground facilities could act as migration pathways for contaminants. Foundations can act as barrier for cleanup of soil or groundwater.	• If contaminants determined to be present, implement design elements within utility corridors or other infrastructure to limit contaminant migration. These elements can include avoidance measures (alternate utility routes), physical barriers to prevent potential migration, or relief elements, such as vents for volatile contaminants and mitigation of gas buildup. If determined to be necessary, implement cleanup actions prior to or during construction and/or implement design elements that incorporate remedial actions.

6. REFERENCES

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Attachment A

EDR Report

Available on request from the Seattle Department of Transportation

Attachment B

Sanborn Map Reports

Available on request from the Seattle Department of Transportation

Attachment C

Phase I Site Assessments

Available on request from the Seattle Department of Transportation